Computational Intelligence Practical Projects

Practical 1: Travelling Salesman Problem by GA

Dr. Wenjun Wang, 3.30 pm on 10th Oct 2023

DDl: 3.30 pm on 25th Oct 2023

In this practical project, you will be asked to address the TSP by using Genetic Algorithm. The target of TSP is to find the minimum routine for a salesman given a set of cities with their locations. No restrict on the starting city but once visit for one city. For details, please see following figure,

Figure for illustrate TSP

This work will contain two parts, the first one is a simple case for your designing and testing, the second part is more challengeable one for 70 cities.

Part A, compulsory one

given the locations of 8 cities, please answer the following question better with a demo.

	A	B	C	D	E	F	G	H
A	0	8	3	1	4	9	3	6
B	8	0	5	10	11	4	3	6
C	3	5	0	8	7	1	5	12
D	1	10	8	0	9	11	6	4
E	4	11	7	9	0	5	17	3
F	9	4	1	11	5	0	4	1
G	3	3	5	6	17	4	0	7
H	6	6	12	4	3	1	7	0

In this table the number stands for distance between 2 cities, e.g. D(A,C) = 3, means distance from City A to City B is 3.

Q1, How will you encode the solution?

Q2, How will you estimate the solution?

Q3, How will you set the fitness function?

Q4, How will you employ evolutionary operators to generate new offspring, what about the parameter setting? Are they effective?

Q5, How will you set the terminal criterion? Does it perform effectively?

Q6, what is your final results? And please summary conclusions from this demo.

Part B, optional challenge for 70 cities TSP

Please find the dataset attached and use your program to solve this challenge. Attached is the location of 70 cities, you need to calculate the distance between each 2 pairs first, then execute your GA.

64,96	40,35	48,83	56,63
80,39	68,40	75,81	10,55
69,23	92,34	8,19	98,7
72,42	62,1	20,18	16,74
48,67	28,43	54,38	89,60
58,43	76,73	63,36	48,82
81,34	67,88	44,33	81,76
79,17	93,54	52,18	29,60
30,23	6,8	12,13	17,22
42,67	87,18	25,5	5,45
7,76	30,9	58,85	79,70
29,51	77,13	5,67	9,100
78,92	78,94	90,9	17,82
64,8	55,3	41,76	74,67
95,57	82,88	25,76	10,68
57,91	73,28	37,64	48,19
67,99	20,55	27,43	83,86
	95,86		84,94